

Teacher Guide for the Lesson on **inequality**

Standard:
6.10(B)

Content Objective:

We can determine if a value makes an **inequality** true by evaluating the **inequality** using **operations**.

Language Objective: Answer the following question in complete sentences using the sentence stem and the key vocabulary of the lesson:

How do you know if a value satisfies an **inequality**?

*I know if a value satisfies an **inequality** by...*

Other key vocabulary: equation

inequality

INEQUALITIES	ADDING/SUBTRACTING	MULTIPLYING BY A NEGATIVE
$>$	$\textcircled{1} \quad x + 8 > 32$	$\textcircled{1} \quad -2x > 14$
$<$	$\textcircled{2} \quad x + \overset{+8}{8} > \overset{+32}{-8} - 8$	$\textcircled{2} \quad \frac{-2x}{-2} > \frac{14}{-2}$
$\geq$	$\textcircled{3} \quad x > \overset{-8}{32} - 8$	$\textcircled{3} \quad x > \frac{14}{-2}$
$\leq$	$\textcircled{4} \quad x > 24$ ✓	$\textcircled{4} \quad x \otimes -7$ ✓
$>$	$\textcircled{5} \quad x < \overset{+6}{-8} + 6$	$\textcircled{5} \quad x \otimes -7$ ✓
$<$	$\textcircled{6} \quad x < \overset{+6}{-8} + 6$	$\textcircled{6} \quad x \otimes -7$ ✓
$\geq$	$\textcircled{7} \quad x < 24$ ✓	$\textcircled{7} \quad x \otimes -7$ ✓
$\leq$	$\textcircled{8} \quad x < 24$ ✓	$\textcircled{8} \quad x \otimes -7$ ✓
	MULTIPLYING/DIVIDING BY A POSITIVE	DIVIDING BY A NEGATIVE
	$\textcircled{1} \quad 6x < 24$	$\textcircled{1} \quad -\frac{x}{8} \leq 12$
	$\textcircled{2} \quad \frac{6x}{6} < \frac{24}{6}$	$\textcircled{2} \quad (-8) \frac{x}{8} \leq 12(-8)$
	$\textcircled{3} \quad x < \frac{24}{6}$	$\textcircled{3} \quad x \leq 12(-8)$ (Switch the signs!)
	$\textcircled{4} \quad x < 4$ ✓	$\textcircled{4} \quad x \otimes -96$ ✓
	$\textcircled{5} \quad x \geq 15$ ✓	

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By studying this visual, students might:

Notice	Wonder
• Inequality symbols like $>$, $<$, $\geq$, and $\leq$ are used Adding or subtracting values doesn't change the inequality sign Multiplying or dividing by a positive number keeps the inequality sign the same Multiplying or dividing by a negative number flips the inequality sign A character at the bottom says "Switch the signs!" when dividing by a negative	• Why do we need to flip the inequality when multiplying or dividing by a negative?
• Adding or subtracting values doesn't change the inequality sign	• What happens if we forget to switch the sign?

• Multiplying or dividing by a positive number keeps the inequality sign the same	• Can an inequality ever use an equal sign?
• Multiplying or dividing by a negative number flips the inequality sign	• Why do positives and negatives affect the inequality differently?
• A character at the bottom says “Switch the signs!” when dividing by a negative	• Can the inequality symbol flip more than once in a problem?

EXTENDING THE DISCUSSION

- After randomly calling on students, if there is anything from this list that was not mentioned, then ask the class, "Did anyone notice...?"
- After students have shared what they notice, ask the class, "Did anyone wonder...?" using the suggestions above or anything else you might think is interesting or relevant to the lesson.

Structured Conversation Prompts

OBSERVATIONAL	RELATIONAL	INFERENTIAL
What is an inequality? An inequality is...	How is an inequality different from an equation? An inequality is different from an equation because...	How do you know if a value satisfies an inequality? I know if a value satisfies an inequality by...

Example Student Responses to the Observational Question

Low-Level	High-Level
An inequality is a math problem with the “greater than” or “less than” sign.	An inequality is a math sentence that compares values and can use symbols like greater than or less than, showing that one side isn’t always equal to the other.

RESPONDING TO RESPONSES

Emphasize and celebrate each student's use of the key vocabulary to support a culture of "no wrong answers."

STRUCTURING STUDENT CONVERSATIONS

Have students list observations from the visual as a warm-up, then use the Q-SSS-A process to guide small-group conversations. In the slide decks, brackets can be moved to prepare the structured conversation. In the example to the right, students will be instructed: [Q-SSS-A](#).

- To put a thumb up, then lower their hand when they are ready to answer the question
- To share with their elbow/shoulder partner, and that the student with the darkest shoe will share first
- That they will be randomly called on after the conversation



[Here is an example](#) of structuring a conversation with Q-SSS-A.

Note: the inferential question is the same as the language objective. It is recommended that students answer the inferential question in a small-group discussion before answering it individually as the closure or exit ticket of the lesson.

Structured Reading

READING PURPOSE	PAT LIST	POST-READING DISCUSSION
To explore how different operations change an inequality and how that helps you check your answer	• A situation where you must flip the inequality sign • The difference between solving equations and inequalities • A symbol that shows a comparison • An example of solving an inequality • Something that affects whether a number works in an inequality	What do you have to pay attention to when solving an inequality? <i>When solving an inequality, I have to pay attention to...</i>

STRUCTURING THE READING

Communicate the purpose of reading to the students and instruct them to make a note every time they see something on the PAT ("Pay Attention To") list. How you have students note items on the PAT list is up to you. This could include:

- Putting an asterisk in the margin
- Underlining text that supports the PAT list
- Putting a comment in the margin

Follow the reading with the post-reading discussion. Structure this discussion using the Q-SSS-A process just like the structured conversations in this lesson.

Note: you might find the relational question is better discussed before or after the reading. This depends on whether the relational question is directly related to the reading or might make connections across units.

DIFFERENTIATING THE READING

You will notice that three different reading passages are provided with this lesson. Look at the shapes in the top-left of each passage to determine the grade level.

BELOW GRADE LEVEL	ON GRADE LEVEL	ABOVE GRADE LEVEL
 <i>Triangle is bottom-left</i>	 <i>Square is bottom-left</i>	 <i>Circle is bottom-left</i>

In a class with students at diverse reading level proficiencies, you can give the appropriate reading passage to different students, while having all students follow the same PAT list and post-reading discussion.